No. 9900304

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Monsanto Company

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED, PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'Thunderbolt'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of Washington, D.C. this twenty-ninth day of February, in the year of our Lord two thousand.*

Attest:

Commissioner
Plant Variety Protection Office

Secretary of Agriculture

Local Reproduction of FORM - OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE DIVISION - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the privacy Act of 1974 (5 U.S.C. 552a)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421) Information is held confidential until certificate is issued (7 U.S.C. 2426).

MNH 2-8-2000

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
Monsanto Company
~~HybriTech U.S., a unit of Monsanto Company~~

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER
W95-188

3. VARIETY NAME
Thunderbolt

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*
5912 N. Meridian Street
Wichita, Kansas 67204-1699

5. TELEPHONE *(include area code)*
316-755-1250

6. FAX *(include area code)*
316-755-0072

FOR OFFICIAL USE ONLY
PVPO NUMBER 9900304

FILING DATE 5/27/99

7. GENUS AND SPECIES NAME
Triticum aestivum

8. FAMILY NAME *(Botonical)*
Gramineae

FEES RECEIVED
FILING AND EXAMINATION FEE: ~~$150~~ $2450.00
DATE 5/27/99
CERTIFICATION FEE
DATE

9. CROP KIND NAME *(common name)*
Hard Red Winter Wheat

10. IF THE APPLICANT NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association,etc.) (common name)*
Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
Delaware

12. DATE OF INCORPORATION
1933

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Dr. Blaine Johnson, Program Director
~~806 N. Second Street~~
MONSANTO
Wichita Wheat Technology Center
~~PO Box 1320~~
5912 North Meridian
~~Berthoud, Colorado 80513~~
Wichita KS 67204

AND

MS. Chris **~~Mr. Robert~~ Bruns**
806 N. Second Street
PO Box 30
Berthoud, Colorado 80513
970-532-3721

14. TELEPHONE *(include area code)*
~~970-532-9840~~
316-755-7705

15. FAX *(include area code)*
316-755-0072
~~970-532-2035~~

16. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(follow instructions on reverse)*

a. [X] Exhibit A. Origin and Breeding History of the Variety
b. [X] Exhibit B. Statement of Distinctness
c. [X] Exhibit C. Objective Description of the Variety
d. [X] Exhibit D. Additional Description of the Variety
e. [X] Exhibit E. Statement of the Basis of the Applicant's Ownership
f. [X] Voucher Sample *(2,500 viable untreated seeds, or, for tuber propagated varieties veification that tissue culture will be deposited and maintained in a public repository)*
g. [X] Filing and Examination Fee *($2,450)*, made payable to "Treasurer of the United States" *(Mail to PVPO)*

17. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY, AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act)*
[X] YES *(if "yes", answer items 18 and 19 below)* [ ] NO *(if "no", go to item 20)*

18. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
[X] YES [ ] NO

19. IF 'YES' TO ITEM 18, WHICH CLASSES OF PRODUCTION BEYOND BREEDERS SEED?
[X] FOUNDATION [X] REGISTERED [X] CERTIFIED

20. HAS THE VARIETY OR A HYBRID PRODUCED FROM THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
[ ] YES *(IF "YES", give names of countries and dates)* [X] NO

21. The applicant(s) declare that a viable sample of basic seed of the variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned applicant(s) is(are) the owner(s) of this sexually reproduced or tuber plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT (Owner{s})		SIGNATURE OF APPLICANT (Owner{s})	
Blaine Johnson			
NAME *(Please print or type)* Dr. Blaine Johnson		NAME *(Please print or type)*	
CAPACITY OR TITLE Program Director ~~Technical Director U.S. Research~~	DATE 14 April 1999	CAPACITY OR TITLE	DATE

SD-470 (04-95)

(See reverse for instructions and information collection burden statement)

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Exhibit A.
Origin and Breeding History of Thunderbolt

Thunderbolt was an F3 derived single plant selection from the cross 'Abilene' / KS90WGRC10 [TAM 107*3/TA2460 (*Triticum tauschii*)], PI549278. The cross was made in 1990 and the single plant selection based upon plant height, fertility and the absence of leaf rust was made in Berthoud, Colorado in 1993. The resulting F4 plant row was tested in preliminary yield trials in 1994 where they were further screened for height, fertility and foliar diseases. Thunderbolt has been tested as a pure-line in replicated trials in 1995, 1996, 1997 and 1998 where it was further screened for the previously mentioned traits as well as uniformity and quality. These replicated trials represent a broad geographic area in the Hard Winter Wheat region.

In 1996, 48 head-rows were grown in Berthoud, Colorado and evaluated for phenotypic similarity. Twelve rows, phenotypically similar for plant height and maturity, were harvested individually and grown in Berthoud, Colorado in 1997 as a 0.1 acre progeny initial increase. Seven of these progeny plots were selected based on phenotypic similarity for plant height and maturity. These plots were harvested and bulked to be grown as a 3.9 acre increase in 1998, which produced 16,550 pounds of breeder seed.

Thunderbolt was uniform and stable in 1997 and 1998. About 0.8% of the plants were rogued from the Initial Breeder's Seed increase in 1997. Approximately 85% of the rogued variant plants were taller height wheat plants (5 to 15 cm.), 3% were awnletted wheat plants and 2% were white chaffed wheat plants. Up to 1.0% variant plants may be encountered in subsequent generations.

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Exhibit B.
Statement of Distinctness

Thunderbolt is most similar to the hard red winter wheat 'Tam 107'. However it can be easily distinguished by the following morphological characteristics:

-Thunderbolt has a green plant color at boot stage (R.H.S. Plant Color Chart No. 137B; Berthoud, Colorado 1996, 1997, 1998). Tam 107 has a blue-green plant color at boot stage (R.H.S. Plant Color Chart No. 124A; Berthoud, Colorado 1996, 1997, and 1998).

-Thunderbolt has a semierect juvenile growth habit (Berthoud, Colorado 1996, 1997, 1998). Tam 107 has a prostrate juvenile growth habit (PVPA#8500181 Exhibit C., Objective Description).

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY

WHEAT *(Triticum* Spp.)

NAME OF APPLICANT(S)	FOR OFFICIAL USE ONLY
~~HybriTech U.S., a unit of~~ **Monsanto Company**	PVPO NUMBER 9900304
ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)* **5912 N. Meridian Street Wichita, Kansas 67204-1699**	NAME OR EXPERIMENTAL DESIGNATION **Thunderbolt**

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in the first box when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized standard may be used to determine plant colors; designate system used.
Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

[1] 1=Common 2=Durum 3=Club 4=Other *(specify)* _____

2. VERNALIZATION:

[2] 1=Spring 2=Winter 3=Other *(specify)* _____

3. COLEOPTILE ANTHOCYANIN:

[1] 1=Absent 2=Present

4. JUVENILE PLANT GROWTH:

[2] 1=Prostrate 2=Semi-erect 3=Erect

5. PLANT COLOR *(boot stage)*:

[2] 1 = Yellow-Green 2 = Green 3 = Blue-Green

6. FLAG LEAF *(boot stage)*:

[2] 1 = Erect 2 = Recurved

[2] 1 = Not Twisted 2 = Twisted

7. EAR EMERGENCE:

[0][0] Number of Days Earlier Than _____ *

[0][3] Number of Days Later Than **Tam 107** *

8. ANTHER COLOR:

[1] 1 = YELLOW 2 = PURPLE

9. PLANT HEIGHT *(from soil to top of head, excluding awns)*:

[0][8] cm Taller Than **Tam 107** *

[0][0] cm Shorter Than _____ *

* Relative to a PVPO-Apprved Commercial Variety Grown in the Same Trial

10. STEM:

A. ANTHOCYANIN

[1] 1= Absent 2=Present

B. WAXY BLOOM

[2] 1=Absent 2=Present

C. HAIRINESS (*last internode of rachis*)

[2] 1=Absent 2=Present

D. INTERNODE (*specify number*) _____

[1] 1=Hollow 2=Semi-solid 3=Solid

E. PEDUNCLE

[1] 1=Erect 2=Recurved

[4][2] cm Length

11. HEAD (*at Maturity*):

A. DENSITY

[2] 1=Lax 2=Middense 3= Dense

B. SHAPE

[1] 1 = Tapering 2= Strap 3 = Clavate 4 = Other (*specify*) _____

C. CURVATURE

[2] 1 = Erect 2 = Inclined 3 = Recurved

D. AWNEDNESS

[4] 1 = Awnless 2 = Apically Awnletted 3 = Awnletted 4 = Awned

12. GLUMES (*at Maturity*):

A. COLOR

[2] 1 = White 2 = Tan 3 = Other (*specify*) _____

B. SHOULDER

[2] 1 = Wanting 2 = Oblique 3 = Rounded 4 = Square 5 = Elevated 6 = Apiculate

C. BEAK

[3] 1 = Obtuse 2 = Acute 3 =Acuminate

D. LENGTH

[2] 1 = Short (ca. 7mm) 2 = Medium (ca. 8mm) 3 = Long (ca. 9mm)

E. WIDTH

[2] 1 = Narrow (ca. 3mm) 2 = Medium (ca. 3.5mm) 3 = Wide (ca. 4mm)

13. SEED:

A. SHAPE

[1] 1 = Ovate 2 = Oval 3 = Elliptical

B. CHEEK

[1] 1=Rounded 2=Angular

C. BRUSH

[2] 1=Short 2=Medium 3=Long

[1] 1 = Not Collared 2 = Collared

D. CREASE

[1] 1 = Width 60% or less of Kernel
2 = Width 80% or less of Kernel
3 = Width Nearly as Wide as Kernel

[1] 1 = Depth 20% or less of Kernel
2 = Depth 35% or less of Kernel
3 = Depth 50% or less of Kernel

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13. SEED: (continued)

E. COLOR

[3] 1 = White 2 = Amber 3 = Red 4 = Other (*specify*) _____

F. TEXTURE

[1] 1=Hard 2=Soft

G. PHENOL REACTION (*see instructions*):

[0] 1 = Ivory 2 = Fawn 3 = Light Brown 4 = Dark Brown 5 = Black

14. DISEASE: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

[3]	Stem Rust (*Puccinia graminis* f. sp. *tritici*) Field races	[4]	Leaf Rust (*Puccinia recondita* f. sp. *tritici*) Field races
[0]	Stripe Rust (*Puccinia striiformis*)	[0]	Loose Smut (*Ustilago tritici*)
[0]	Tan Spot (*Pyrenophora tritici-repentis*)	[0]	Flag Smut (*Urocystis agropyri*)
[0]	Halo Spot (*Selenophoma donacis*)	[0]	Common Bunt (*Tilletia tritici or T. laevis*)
[0]	*Septoria nodorum* (Glume Blotch)	[0]	Dwarf Bunt (*Tilletia controversa*)
[0]	*Septoria avenae* (Speckled Leaf Disease)	[0]	Karnal Bunt (*Tilletia indica*)
[0]	*Septoria tritici* (Speckled Leaf Blotch) Field races	[0]	Powdery Mildew (*Erysiphe graminis* f. sp. *tritici*) Field races
[0]	Scab (*Fusarium* spp.)	[0]	Snow Molds
[0]	Black Point (Kernel Smudge)	[0]	Common Root Rot (*Fusarium, Cochliobolus* and *Bipolaris* spp.)
[0]	Barley Yellow Dwarf Virus (BYDV)	[0]	Rhizoctonia Root Rot (*Rhizoctonia solani*)
[0]	Soilborne Mosaic Virus (SBMV) Field races	[0]	Black Chaff (*Xanthomonas campestris* pv. *translucens*)
[0]	Wheat Yellow (Spindle Streak) Mosaic Virus Field races	[0]	Bacterial Leaf Blight (*Pseudomonas syringae* pv. *syringae*)
[0]	Wheat Streak Mosaic Virus (WSMV) Field races	[ ]	Other (*specify*)
[ ]	Other (*specify*)	[ ]	Other (*specify*)
[ ]	Other (*specify*)	[ ]	Other (*specify*)
[ ]	Other (*specify*)	[ ]	Other (*specify*)

15. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

0	Hessian Fly (*Mayetiola destructor*)		Other (*specify*)
0	Stem Sawfly (*Cephus* spp.)		Other (*specify*)
0	Cereal Leaf Beetle (*Oulema melanopa*)		Other (*specify*)
0	Russian Aphid (*Diuraphis noxia*)		Other (*specify*)
0	Greenbug (*Schizaphis graminum*)		Other (*specify*)
0	Aphids		

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS:

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Exhibit D.
Additional Description of Thunderbolt

Thunderbolt is a hard red winter wheat bred by Agripro Seeds, Inc. Thunderbolt is a variety with good test weight and average strength straw. It is a medium height semidwarf with medium maturity. Thunderbolt is tolerant to leaf rust and has intermediate resistance to stem rust. Milling and baking characteristics are good.

Juvenile growth habit is semierect. Seedling anthocyanin is present. Plant color at boot stage is green. Auricle anthocyanin and auricle hairs are present. Flag leaf at boot stage is recurved and twisted. Waxy bloom is present on the head, stem and flag leaf sheath. Anther color is yellow. Head shape is tapering and awned. Glumes are glabrous, medium in width and medium in length with oblique shoulders and acuminate beaks. Seed shape is ovate. Brush hairs are medium in size. Seed crease depth is shallow and width is narrow. Seed cheeks are rounded.

Thunderbolt is well adapted to the western production areas of Nebraska, Kansas, Oklahoma, Eastern Colorado and the panhandle of Texas.

HybriTech

Plains Team Quality Summary

Year-Loc	Wht Prot	Flr Prot		Norris Hard	Flr Yld		Ash	Mixogram Peak Time	Mixogram Peak HT	Mixogram Tol.		Abs		Mix Time		Loaf Vol		Crumb Grain	Crumb Tex	Crumb Color	Over All	Comments
	14%mb	14%mb	R		%	R		min	N.U.	mm	R	%	R	min	R	cc	R	R	R	R	R	
THUNDERBOLT																						
1995 - GK	13.7	12.6	4	61	70.4	3		4.50	5.0	1214	4	65.0	4	4.50	1	850	4	4	3	3	42	
1996 - GK	14.3	13.1	3	70	72.7	3		3.50	5.3	1010	5	65.0	3	3.50	1	1105	3	5	2	2	40	
1997 - SK	11.4	10.2	4	70	71.1	4	0.366	3.25	5.0	1120	3	58.0	6	3.25	3	625	5	6	4	2	52	
1998 - SK	11.6	10.6		68	72.1		0.346	3.50	5.0	1018		63.0		3.50		930		4	3	3		
Average:	**12.8**	**11.6**	**4**	**67**	**71.6**	**3**	**0.356**	**3.69**	**5.1**	**1091**	**4**	**62.8**	**4**	**3.69**	**2**	**878**	**4**	**5**	**3**	**3**	**45**	
HAWK																						
1995 - GK	13.0	11.9	5	51	68.4	5		5.50	5.0	1410	3	65.0	4	5.50	1	720	5	4	4	4	47	
1996 - GK	13.9	12.6	4	76	72.9	3		4.25	5.0	1215	4	63.0	4	4.25	1	1160	3	3	2	3	37	
1997 - SK	11.1	10	4	70	72.2	3	0.422	4.00	5.0	1148	3	59.0	5	4.00	1	620	5	6	4	4	48	
1998 - SK	10.5	9.2		82	72.3		0.414	4.00	4.5	1158		60.0		4.00		940		3	4	4		
Average:	**12.1**	**10.9**	**4**	**70**	**71.5**	**4**	**0.418**	**4.44**	**4.9**	**1233**	**3**	**61.8**	**4**	**4.44**	**1**	**860**	**4**	**4**	**4**	**4**	**44**	

THUNDERBOLT

Yield Summary Over-years by Region and State															
	Yield (Bu/A)			1995 Yield (Bu/A)			1996 Yield (Bu/A)			1997 Yield (Bu/A)			1998 Yield (Bu/A)		
Region	Locs	W95-188	TRIAL MEAN	Locs	W95-188	TRIAL MEAN	Locs	W95-188	TRIAL MEAN	Locs	W95-188	TRIAL MEAN	Locs	W95-188	TRIAL MEAN
Continuous	17	68.5	61.4				1	30.7	23.1	4	79.7	72.4	12	67.9	61.0
Irrigated	9	82.7	82.4	1	92.8	87.5	1	115.5	114.5	1	92.9	113.2	6	73.9	71.1
Dryland	21	59.4	57.2	2	55.6	48.7	3	56.2	48.8	3	71.6	67.3	13	57.9	58.2
State															
Colorado	6	97.5	95.9	1	92.8	87.5	1	115.5	114.5	1	92.9	113.2	3	94.6	86.9
Kansas	25	63.9	59.2	2	55.6	48.7	2	44.2	31.0	6	79.0	73.4	15	61.6	58.8
Nebraska	7	71.6	73.1				1	80.3	84.3	1	60.1	50.8	5	72.1	75.4
Oklahoma	6	61.2	49.1				1	30.7	23.1				5	67.3	54.3
Texas	3	63.4	67.6										3	63.4	67.6
Overall	47	67.2	63.5	3	68.0	61.6	5	63.0	56.8	8	78.4	75.6	31	67.6	64.3

Var./Line	Heading	Maturity	Coleoptile	Height	Straw Strength	Leaf Rust Severity	Leaf Rust Reaction	Stem Rust Severity	Stem Rust Reaction	Powdery Mildew	Hessian fly	WSMV	SBMV	SSMV
THUNDERBOL	4	4	3	4	4	1	1	2	7	6	8	3	5	5
TAM 107	3	3	3	4	4	9	9	5	6	2	8	3	8	6

Data generated in 1995:

Colorado - Yield, Test Wt., Heading, Leaf Rust, Lodge Severity,
Powdery mildew, Hessian fly, Aluminum tolerance (Lab Screen), Coleoptile length
Goodland, KS - Yield, Test Wt., Lodge Severity
Beloit, KS - Tan Spot
Salina, KS - Yield, Test Wt., Heading, Height, Leaf Rust, Septoria
Everest, KS - Winterkill, Spindle Streak, Soilborne
Saint John, KS - Spindle Streak
Dumas, TX - Test Wt., Shatter, Leaf Rust
Wichita, KS - Leaf Rust, Septoria, Tan Spot

Data generated in 1996:

Colorado - Yield, Test Wt., Heading, Pollination, Maturity, Height,
Leaf Rust (greenhse screening), Powdery Mildew, Hessian fly,
Coleoptile length, Aluminum Tolerance (Lab screening)
Imperial, NE - Yield, Test Wt., Lodging
Salina, Everest, KS - Yield, Test Wt. Winterkill, Maturity
Goodland, KS, Nardin, OK - Yield, Test Wt., Maturity
Goodland, KS (Irrigated) - Yield, Test Wt., Lodging, Septoria, Wheat Streak
Garden City, KS - Maturity
Dumas, TX - Yield, Test Wt.
Hays, KS - WSMV (Visual screening).

Data generated in 1997:

Colorado - Yield, Test Wt., Heading, Height, Leaf Rust, Lodge Severity,
Powdery mildew, Hessian fly, Aluminum tolerance, Coleoptile length
Goodland, KS, Hugoton, KS - Yield, Test Wt.
Beloit, KS - Yield, Test Wt., Leaf Rust, Tan Spot
Salina, KS - Yield, Test Wt., Heading, Leaf Rust, Septoria
Quinter, KS - Yield, Test Wt., Leaf Rust, Tan Spot, Lodge Severity
Haven, KS - Yield, Test Wt., Lodge Severity, Shatter
Enid, OK - Aluminum Tolerance
Nardin, OK - Heading, Maturity, Leaf Rust, Septoria
Vernon, TX - Leaf Rust
Paxton, NE - Winterhardiness
Geneva, NE - Yield, Test Wt., Leaf Rust, Green Leaf Retention

Data generated in 1998:

Colorado - Yield, Test Wt., Heading, Height, Lodge Severity,
Powdery mildew, Coleoptile length
Goodland, KS - Yield, Test Wt., Heading, Spring Growth
Beloit, KS - Yield, Test Wt., Leaf Rust, Tan Spot, Maturity, Lodge severity
Salina, KS - Yield, Test Wt., Height, Maturity
Quinter, KS - Yield, Test Wt., Heading, Lodge Breakage, Spring Growth
Hugoton, KS - Yield, Test Wt.
Haven, KS - Yield, Test Wt., Maturity, Powdery Mildew
Enid, OK - Aluminum Tolerance
Nardin, OK - Yield, Test Wt., Leaf Rust, Tan Spot, Septoria
Paxton, NE - Yield, Test Wt.
Hereford, TX - Yield, Test Weight
MacGregor, TX - Leaf Rust, Maturity

Note: Rankings in this table represent the average for a given trait on a 1-9 scale where 1 and 9 represent the extremes for the repective traits.

Trait	1	9
Heading	early	late
Maturity	early	late
Coleoptile	long	short
Height	short	tall
Straw Strength	strong	weak
All disease & insect ratings	resistant	susceptible

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990030!

HRWW Over-Year, Over-Location Summary

W95-188 vs. TAM 107

2 year data summary, 1997 - 1998

	Yield Bu/Ac			Test Wt. lb/Bu		
	Locs.	W95-188	TAM 107	Locs.	W95-188	TAM 107
State Summary						
CO						
Irr.	3	94.9	98.3			
Mean:	**3**	**94.9**	**98.3**			
KS						
Cont	9	68.4	60.9	9	62.4	59.4
Dry	3	57.9	55.5	3	62.1	59.4
Irr.	1	79.1	67.5	1	63.6	60.8
Mean:	**13**	**66.8**	**60.2**	**13**	**62.4**	**59.5**
NE						
Dry	1	60.1	39.1	1	63.5	59.3
Irr.	1	94.5	96.5	1	60.8	57.3
Mean:	**2**	**77.3**	**67.8**	**2**	**62.1**	**58.3**
OK						
Cont	1	57.7	34.8	1	64.1	56.0
Mean:	**1**	**57.7**	**34.8**	**1**	**64.1**	**56.0**
SD						
Dry	3	68.2	68.5			
Mean:	**3**	**68.2**	**68.5**			
TX						
Irr.	1	48.8	69.9	1	64.7	62.1
Mean:	**1**	**48.8**	**69.9**	**1**	**64.7**	**62.1**
Water Mgt. Summary						
Cont	**10**	**67.3**	**58.3**	**10**	**62.6**	**58.3**
Dry	**7**	**62.6**	**58.7**	**4**	**62.4**	**59.3**
Irr.	**6**	**84.5**	**88.1**	**3**	**63.0**	**60.0**
OverAll:	**23**	**70.4**	**66.2**	**17**	**62.6**	**59.3**

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)

MAH 2-8-2000

~~HybriTech U.S., a unit of~~ Monsanto Company

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER

W95-188

3. VARIETY NAME

Thunderbolt

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*

5912 N. Meridan Street
Wichita, Kansas 67204-1699

5. TELEPHONE *(include area code)*

316-755-1250

6. FAX *(include area code)*

316-755-0072

7. PVPO NUMBER

8. Does the applicant own all rights to the variety? *Mark an "X" in appropriate block.* **If no, please explain.** [X] YES [ ] NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company? [X] YES [ ] NO

If no, give name of country

10. Is the applicant the original owner? [ ] YES [X] NO ***If no, please answer one of the following:***

a. If original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. national(s)?

[ ] YES [ ] NO **If no, give name of country**

b. If original rights to variety were owned by a company(ies), is(are) the original owner(s) a U.S. based company?

[X] YES [ ] NO **If no, give name of country**

11. Additional explanation on ownership *(if needed, use reverse for extra space)*:

*Please see following page.

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

STD-470-E (07-97) *(Destroy previous editions).*
Electronic version designed using WordPerfect InForms by USDA-AMS-IMB.

Exhibit E.
Statement of the Basis of Applicant's Ownership

The variety for which Plant Variety Protection is hereby sought was developed by Dr. John Moffatt, an employee of Agripro Seeds, Inc. By agreement between employees and Agripro Seeds, Inc., all rights to any invention, discovery, or development made by the employee while employed by Agripro Seeds, Inc., were assigned to Agripro Seeds, Inc., with no rights of any kind pertaining to 'Thunderbolt' being retained by the employees.

By contractual agreement the variety 'Thunderbolt' is currently owned by ~~HybriTech U.S., a unit of~~ Monsanto Company and licensed to Agripro Seeds, Inc. for commercial use.

AMA
01 Mar 2000
per letter